

WHAT IS CLAIMED IS:

1. A liquid crystal panel having a liquid crystal layer sandwiched between a pair of substrates, wherein:

5 said liquid crystal layer comprises a liquid crystal and a cross-linked resin;

said cross-linked resin comprises a cross-linked structural part adhered to a liquid crystal layer contacting surface (adhered, cross-linked structural part) and a terminal part rising from the liquid crystal layer contacting surface (rising terminal part); and  
10 the outer surface of at least one substrate is curved;

2. A liquid crystal panel having a liquid crystal layer sandwiched between a pair of substrates, wherein:

15 said liquid crystal layer comprises a liquid crystal and a cross-linked resin;

said cross-linked resin comprises a cross-linked structural part adhered to a liquid crystal layer contacting surface (adhered, cross-linked structural part) and a terminal part rising from the liquid crystal layer contacting surface (rising terminal part); and  
20 said liquid crystal layer contacting surface is curved.

3. A liquid crystal panel according to claim 1, wherein  
25 said liquid crystal layer contacting surface is curved.

4. A liquid crystal panel according to claim 1, wherein

said liquid crystal panel has a filter layer, and said liquid crystal layer contacting surface is the surface of the filter layer or the surface of an electrode or electrodes installed in contact with the filter layer.

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5. A liquid crystal panel according to claim 2, wherein: said liquid crystal panel has a filter layer, and said liquid crystal layer contacting surface is the surface of the filter layer or the surface of an electrode or electrodes installed in contact with the filter layer.

6. A liquid crystal according to claim 2, wherein said curved surface of the liquid crystal layer contacting surface is composed of a plurality of concavities and convexities.

7. A liquid crystal panel having a liquid crystal layer sandwiched between a pair of substrates, wherein:

said liquid crystal layer comprises a liquid crystal and a cross-linked resin;

said cross-linked resin comprises a cross-linked structural part adhered to a liquid crystal layer contacting surface (adhered, cross-linked structural part) and a terminal part rising from the liquid crystal layer contacting surface (rising terminal part); and

the thickness of one of said substrates is not more than 1/2 of the thickness of the other substrate.

8. A liquid crystal panel according to claim 1, wherein the thickness of one of said substrates is not more than 1/2 of the thickness of the other substrate.

5 9. A liquid crystal panel according to claim 2, wherein the thickness of one of said substrates is not more than 1/2 of the thickness of the other substrate.

10. A liquid crystal panel according to claim 1, wherein the thickness of at least one of said substrates is in the range of from 100 to 500  $\mu\text{m}$ .

11. A liquid crystal panel according to claim 2, wherein the thickness of at least one of said substrates is in the range of from 100 to 500  $\mu\text{m}$ .

12. A liquid crystal panel according to claim 1, wherein the material of one of said substrates is different from that of the other substrate.

20 13. A liquid crystal panel according to claim 2, wherein the material of one of said substrates is different from that of the other substrate.

25 14. A liquid crystal panel according to claim 12, wherein said substrates comprise a glass substrate and a plastic substrate.

15. A liquid crystal panel according to claim 13,  
wherein said substrates comprise a glass substrate and a  
plastic substrate.

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16. A liquid crystal panel according to claim 1, wherein  
said liquid crystal tilts while the tilting direction is  
regulated by uneven parts or slits of an electrode or  
electrodes when voltage is applied.

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17. A liquid crystal panel according to claim 2, wherein  
said liquid crystal tilts while the tilting direction is  
regulated by uneven parts or slits of an electrode or  
electrodes when voltage is applied.

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18. A liquid crystal panel according to claim 1, wherein  
said panel does not have an alignment control film.

19. A liquid crystal panel according to claim 2, wherein  
said panel does not have an alignment control film.

20. A liquid crystal panel according to claim 1, wherein  
said liquid crystal has a negative dielectric anisotropy.

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21. A liquid crystal panel according to claim 2, wherein  
said liquid crystal has a negative dielectric anisotropy.

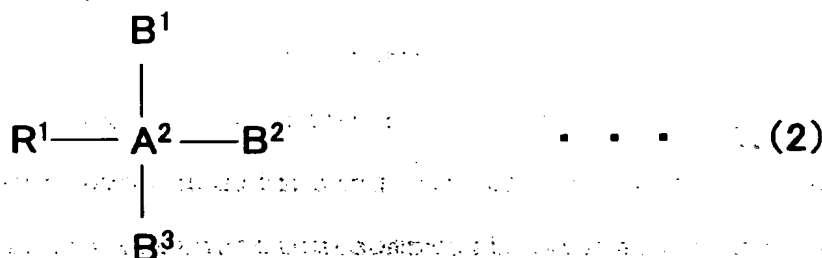
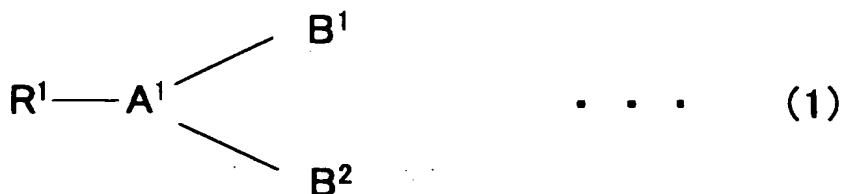
22. A liquid crystal panel according to claim 1, wherein  
said liquid crystal layer is formed by cross-linking, in the  
presence of a liquid crystal, a resin composition comprising  
one or more first compounds having a cross-linkable  
5 structural part, and a hydrophobic terminal part with a  
straight-chain section having three or more carbon atoms  
(hydrophobic, long-chain terminal part).

23. A liquid crystal panel according to claim 2, wherein  
10 said liquid crystal layer is formed by cross-linking, in the  
presence of a liquid crystal, a resin composition comprising  
one or more first compounds having a cross-linkable  
structural part, and a hydrophobic terminal part with a  
straight-chain section having three or more carbon atoms  
15 (hydrophobic, long-chain terminal part).

24. A liquid crystal panel according to claim 22, wherein  
wherein said cross-linkable structural part of the one or  
more first compounds comprises a polar-group structural part.

25. A liquid crystal panel according to claim 23,  
wherein said cross-linkable structural part of the one or  
more first compounds comprises a polar-group structural part.

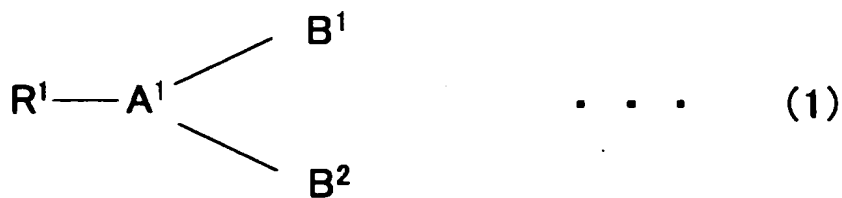
26. A liquid crystal panel according to claim 24,  
wherein at least one compound represented by formula (1) or  
(2) below is included as the one or more first compounds,



(in formulae (1) and (2), R<sup>1</sup> is a hydrophobic, long-chain terminal part; A<sup>1</sup> is a trivalent group comprising an aliphatic chain that may be branched, an aromatic ring that may have a substituting group, an alicyclic ring that may have a substituting group, or nitrogen; A<sup>2</sup> is a tetravalent group comprising an aliphatic chain that may be branched, an aromatic ring that may have a substituting group, or an alicyclic ring that may have a substituting group; B<sup>1</sup>, B<sup>2</sup> and B<sup>3</sup> are, each, a cross-linkable structural part; and R<sup>1</sup>, B<sup>1</sup>, B<sup>2</sup> and B<sup>3</sup> can be selected independently from each other in the formulae).

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27. A liquid crystal panel according to claim 25, wherein at least one compound represented by formula (1) or (2) below is included as the one or more first compounds,

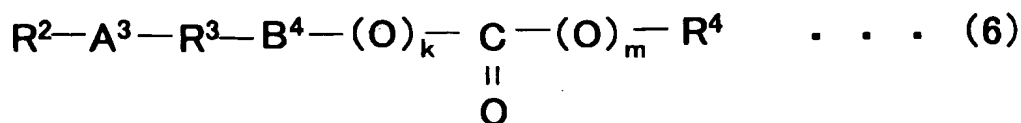
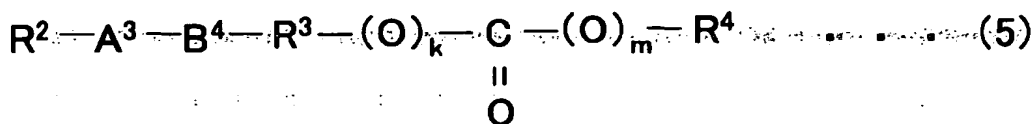
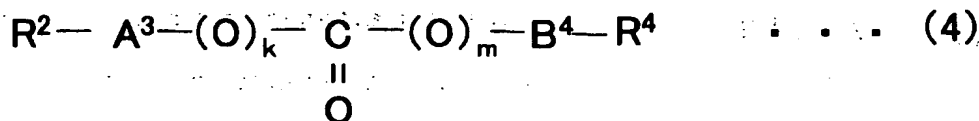
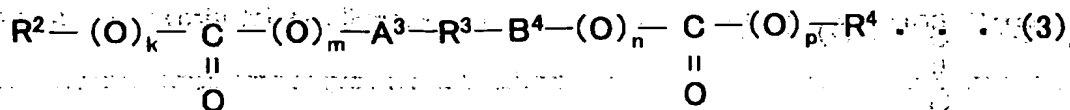


(in formulae (1) and (2),  $\text{R}^1$  is a hydrophobic, long-chain terminal part;  $\text{A}^1$  is a trivalent group comprising an aliphatic chain that may be branched, an aromatic ring that may have a substituting group, an alicyclic ring that may have a substituting group, or nitrogen;  $\text{A}^2$  is a tetravalent group comprising an aliphatic chain that may be branched, an aromatic ring that may have a substituting group, or an alicyclic ring that may have a substituting group;  $\text{B}^1$ ,  $\text{B}^2$  and  $\text{B}^3$  are, each, a cross-linkable structural part; and  $\text{R}^1$ ,  $\text{B}^1$ ,  $\text{B}^2$  and  $\text{B}^3$  can be selected independently from each other in the formulae).

28. A liquid crystal panel according to claim 26, wherein said one or more first compounds comprise a second compound with a cross-linkable structural part and substantially without a hydrophobic, long-chain terminal part.

29. A liquid crystal panel according to claim 27,  
 wherein said one or more first compounds comprise a second  
 compound with a cross-linkable structural part and  
 5 substantially without a hydrophobic, long-chain terminal part.

30. A liquid crystal panel according to claim 28,  
 wherein at least one compound selected from the group  
 consisting of the compounds represented by formulae (3) to  
 10 (6) below is included as the second compound,

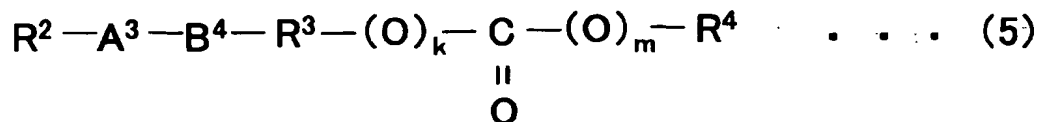
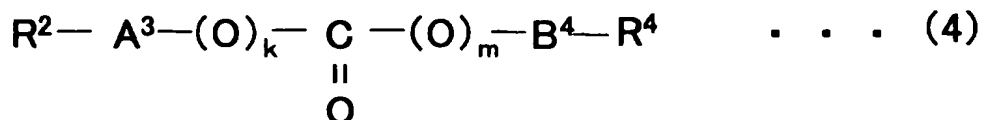
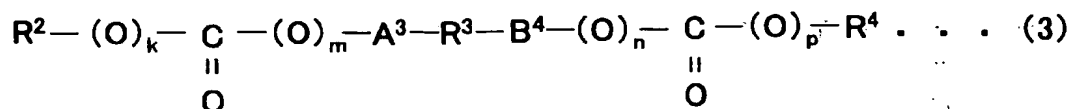


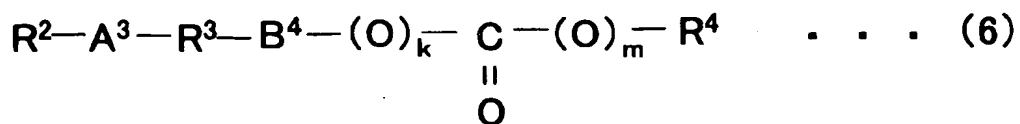
15 (in formulae (3) to (6), A<sup>3</sup> and B<sup>4</sup> are, independently from



each other, a vinylene group or a propenylene group;  $R^3$  is a divalent group;  $R^2$  and  $R^4$  are, independently from each other, hydrogen, an alkyl group that may be branched or an aromatic ring that may be substituted; at least one of  $R^2$ ,  $R^3$  and  $R^4$  is an aromatic ring;  $k$ ,  $m$ ,  $n$  and  $p$  are, independently from each other, 0 (zero) or 1; and  $R^2-R^4$ ,  $A^3$ ,  $B^4$ ,  $k$ ,  $m$ ,  $n$  and  $p$  can be selected independently from each other in the formulae).

31. A liquid crystal panel according to claim 29, wherein at least one compound selected from the group consisting of the compounds represented by formulae (3) to compound (6) below is included as the second compound,





(in formulae (3) to (6),  $A^3$  and  $B^4$  are, independently from each other, a vinylene group or a propenylene group;  $R^3$  is a divalent group;  $R^2$  and  $R^4$  are, independently from each other,

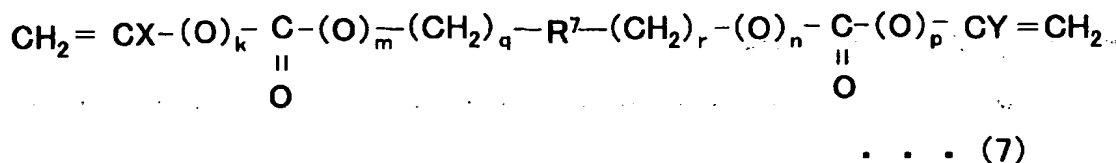
5 hydrogen, an alkyl group that may be branched or an aromatic ring that may be substituted; at least one of  $R^2$ ,  $R^3$  and  $R^4$  is

an aromatic ring;  $k$ ,  $m$ ,  $n$  and  $p$  are, independently from each other, 0 (zero) or 1; and  $R^2-R^4$ ,  $A^3$ ,  $B^4$ ,  $k$ ,  $m$ ,  $n$  and  $p$  can be

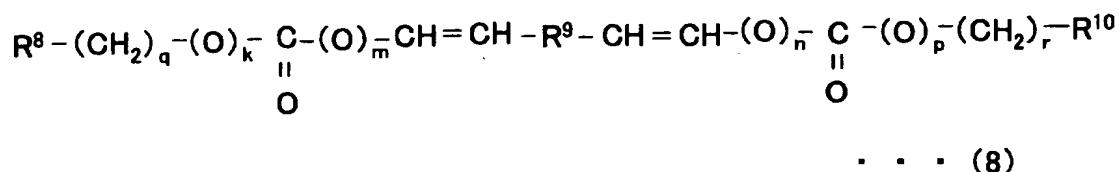
selected independently from each other in the formulae).

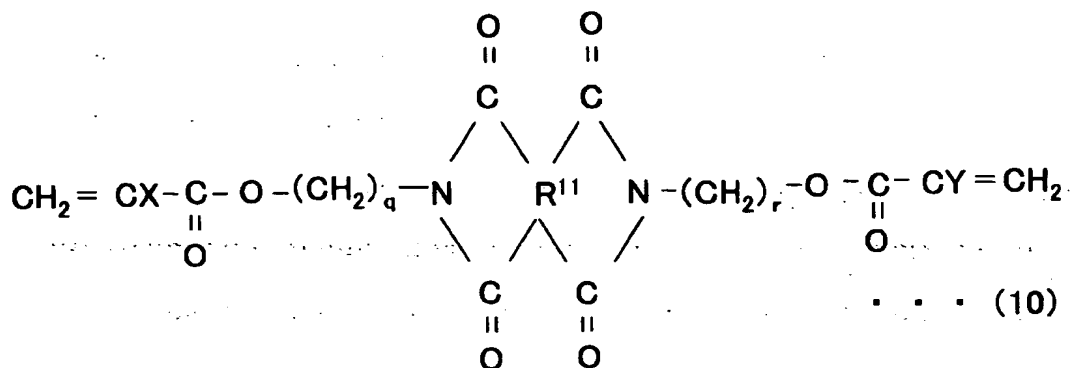
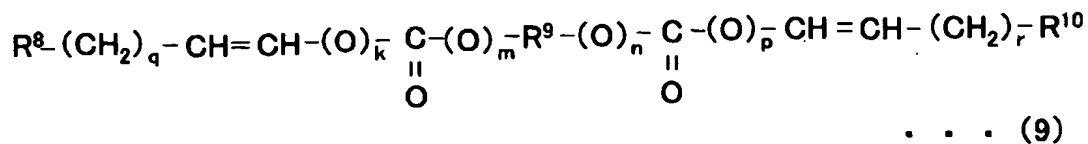
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32. A liquid crystal panel according to claim 30, wherein at least one compound selected from the group consisting of the compounds represented by formulae (7) to (10) below is included as the second compound,



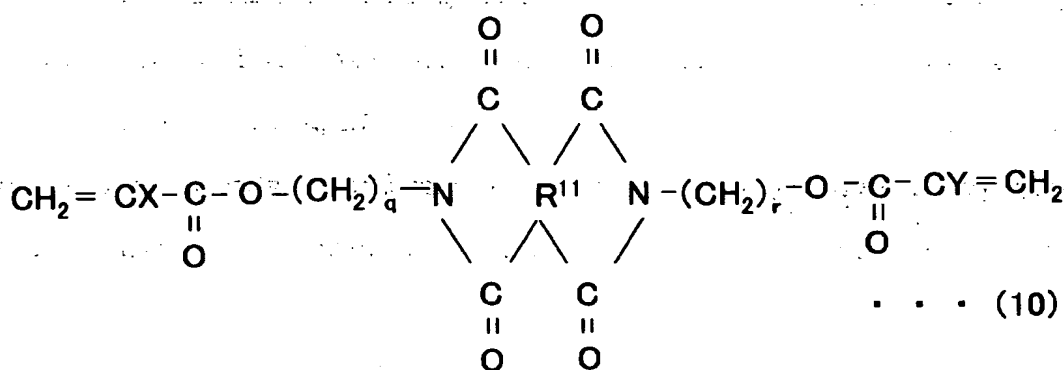
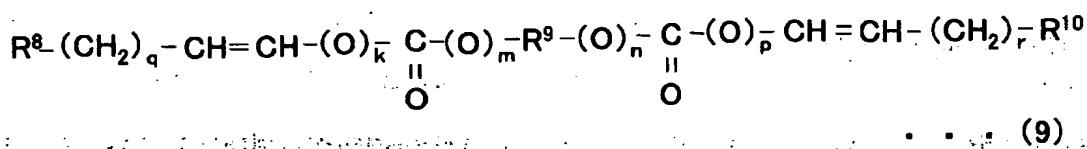
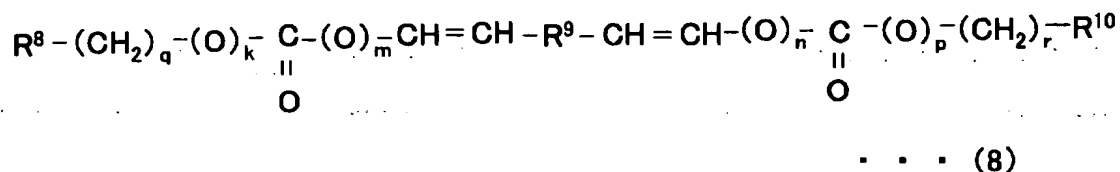
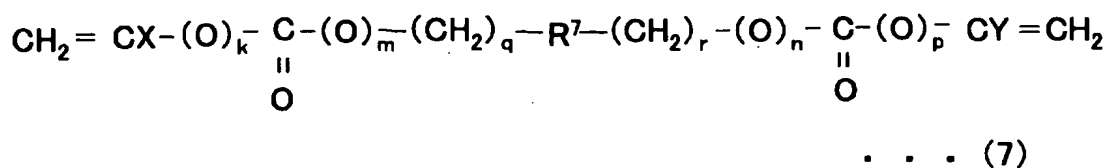
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(in formulae (7) to (10), X and Y are, each independently, hydrogen or a methyl group; R<sup>7</sup> is a divalent organic group having a five-member ring structure; R<sup>8</sup> and R<sup>10</sup> are hydrogen or an organic group; R<sup>9</sup> is a divalent organic group; at least one of R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> has a five-member ring structure; R<sup>11</sup> is a tetravalent organic group constituting a tetracarboxylic acid residue; k, m, n and p are, independently from each other, 0 (zero) or 1; q and r are, independently from each other, an integer not less than 0 (zero) and not more than 6; and R<sup>8</sup>-R<sup>10</sup>, k, m, n, p, q and r can be selected independently from each other in the formulae).

33. A liquid crystal panel according to claim 31, wherein at least one compound selected from the group consisting of the compounds represented by formulae (7) to (10) below is included as the second compound,



(in formulae (7) to (10), X and Y are, each independently, hydrogen or a methyl group; R<sup>7</sup> is a divalent organic group having a five-member ring structure; R<sup>8</sup> and R<sup>10</sup> are hydrogen or an organic group; R<sup>9</sup> is a divalent organic group; at least one of R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> has a five-member ring structure; R<sup>11</sup> is a tetravalent organic group constituting a tetracarboxylic acid residue; k, m, n and p are, independently from each

other, 0 (zero) or 1; q and r are, independently from each other, an integer not less than 0 (zero) and not more than 6; and  $R^8-R^{10}$ , k, m, n, p, q and r can be selected independently from each other in the formulae).

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34. A liquid crystal panel according to claim 7, wherein the thickness of at least one of said substrates is in the range of from 100 to 500  $\mu\text{m}$ .

10 35. A liquid crystal panel according to claim 7, wherein the material of one of said substrates is different from that of the other substrate.

15 36. A liquid crystal panel according to claim 35, wherein said substrates comprise a glass substrate and a plastic substrate.

20 37. A liquid crystal panel according to claim 7, wherein said liquid crystal tilts while the tilting direction is regulated by uneven parts or slits of an electrode or electrodes when voltage is applied.

38. A liquid crystal panel according to claim 7, wherein said panel does not have an alignment control film.

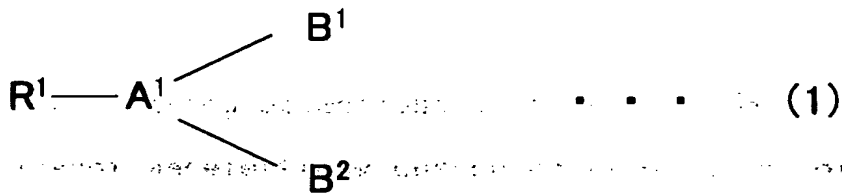
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39. A liquid crystal panel according to claim 7, wherein said liquid crystal has a negative dielectric anisotropy.

40. A liquid crystal panel according to claim 7, wherein said liquid crystal layer is formed by cross-linking, in the presence of a liquid crystal, a resin composition comprising one or more first compounds having a cross-linkable structural part, and a hydrophobic terminal part with a straight-chain section having three or more carbon atoms (hydrophobic, long-chain terminal part).

41. A liquid crystal panel according to claim 40, wherein said cross-linkable structural part of the one or more first compounds comprises a polar-group structural part.

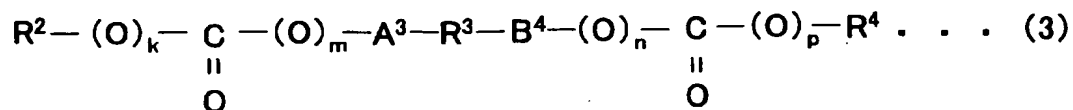
42. A liquid crystal panel according to claim 41, wherein at least one compound represented by formula (1) or (2) below is included as the one or more first compounds,

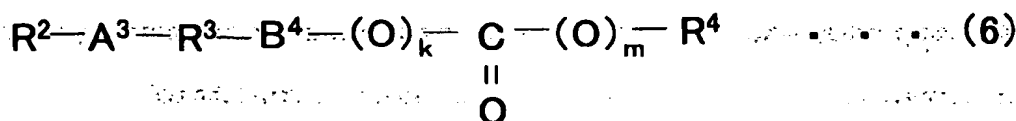
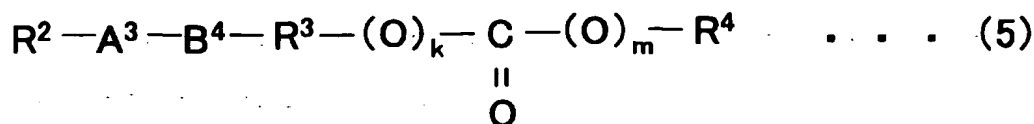
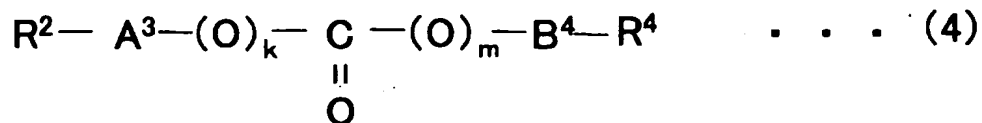


(in formulae (1) and (2),  $R^1$  is a hydrophobic, long-chain terminal part;  $A^1$  is a trivalent group comprising an aliphatic chain that may be branched, an aromatic ring that may have a substituting group, an alicyclic ring that may have a substituting group, or nitrogen;  $A^2$  is a tetravalent group comprising an aliphatic chain that may be branched, an aromatic ring that may have a substituting group, or an alicyclic ring that may have a substituting group;  $B^1$ ,  $B^2$  and  $B^3$  are, each, a cross-linkable structural part; and  $R^1$ ,  $B^1$ ,  $B^2$  and  $B^3$  can be selected independently from each other in the formulae).

43. A liquid crystal panel according to claim 42, wherein said one or more first compounds comprise a second compound with a cross-linkable structural part and substantially without a hydrophobic, long-chain terminal part.

44. A liquid crystal panel according to claim 43, wherein at least one compound selected from the group consisting of the compounds represented by formulae (3) to (6) below is included as the second compound,

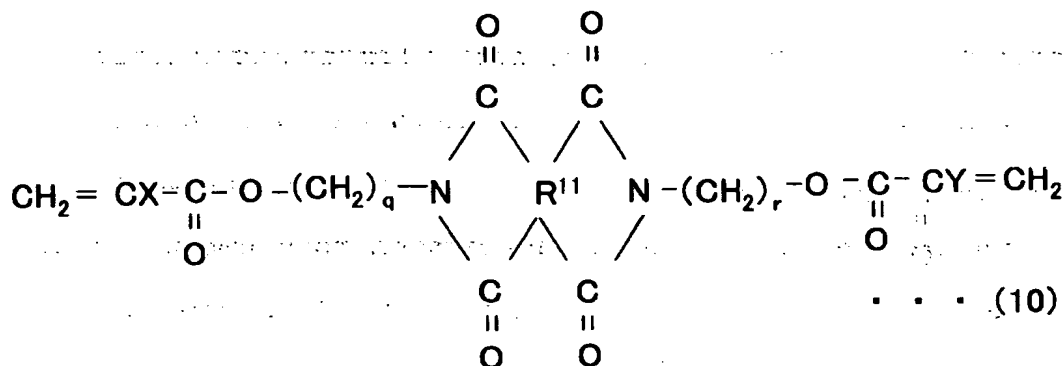
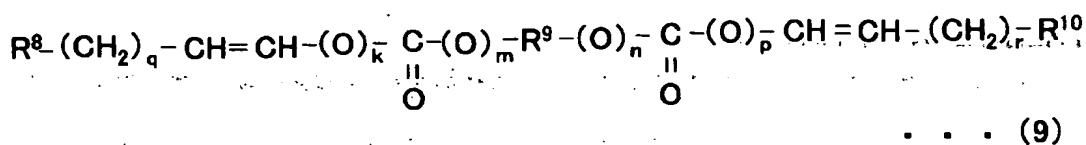
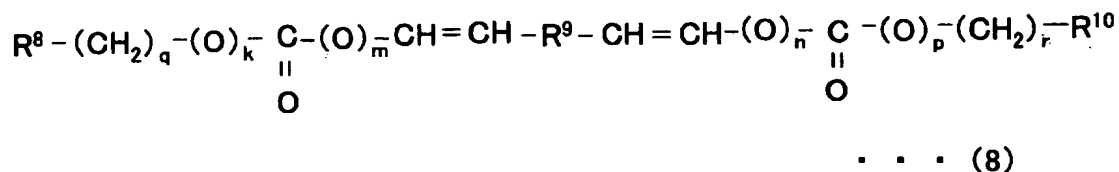
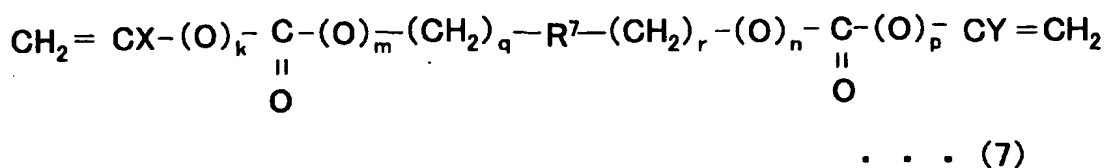




(in formulae (3) to (6), A<sup>3</sup> and B<sup>4</sup> are, independently from each other, a vinylene group or a propenylene group; R<sup>3</sup> is a divalent group; R<sup>2</sup> and R<sup>4</sup> are, independently from each other, hydrogen, an alkyl group that may be branched or an aromatic ring that may be substituted; at least one of R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> is an aromatic ring; k, m, n and p are, independently from each other, 0 (zero) or 1; and R<sup>2</sup>-R<sup>4</sup>, A<sup>3</sup>, B<sup>4</sup>, k, m, n and p can be selected independently from each other in the formulae).

45. A liquid crystal panel according to claim 44, wherein at least one compound selected from the group consisting of the compounds represented by formulae (7) to (10) below is included as the second compound,





5 (in formulae (7) to (10), X and Y are, each independently, hydrogen or a methyl group; R<sup>7</sup> is a divalent organic group having a five-member ring structure; R<sup>8</sup> and R<sup>10</sup> are hydrogen or an organic group; R<sup>9</sup> is a divalent organic group; at least one of R<sup>8</sup>, R<sup>9</sup> and R<sup>10</sup> has a five-member ring structure; R<sup>11</sup> is

10 a tetravalent organic group constituting a tetracarboxylic acid residue; k, m, n and p are, independently from each other, 0 (zero) or 1; q and r are, independently from each

other, an integer not less than 0 (zero) and not more than 6;  
and  $R^8-R^{10}$ , k, m, n, p, q and r can be selected independently  
from each other in the formulae).

- 5        46. A liquid crystal panel comprising a plurality of  
liquid crystal panels according to one of claims 1 to 45  
stacked one over another.